IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Tadashi ISHII et al.

Application No.: 10/720,282 Group Art Unit: 2831

Confirmation No.: 4753 Examiner: William H. Mayo III

Filed: November 25, 2003

For: MULTILAYER INSULATED WIRE AND TRANSFORMER USING THE SAME

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Atsushi HIGASHIURA, declare and state that:

1. I am a Japanese citizen residing at c/o THE FURUKAWA ELECTRIC CO., LTD. 6-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan.

I graduated from the Department of Industrial Chemistry, in Faculty of Engineering of Fukui University in 1981 and thereafter joined THE FURUKAWA ELECTRIC CO., LTD. I had been engaged in development of enamel varnish in said company from 1981. Since 1992, I have been engaged in development of materials for three-layered insulated wires at Ecology & Energy Laboratory (renamed from Hiratsuka Laboratory on March of 2000) of said company.

I am one of the joint inventors of the subject matter of the United States Patent Application No.: 10/720,282, filed on November 25, 2003, and am thus intimately familiar with the contents of the application, its prosecution before the United States Patent & Trademark Office, and the references cited therein.

2. I have studied the contents of the cited Higashiura's Japanese Patent

Publication No. JP-A-10-125140 and Hosoi's Japanese Patent Publication No. JP-A-4-345703.

3. To show the superiority of the present invention, the following tests were conducted, by me or under my supervision:

Test

(Comparative Examples 101 to 104)

Any one of the following four fluororesins (1) to (4) was extrusion-coated onto a conductor, to form a three-layer structure, in which each layer was composed of the same fluororesin. The production line speed of extrusion-coating was made as fast as possible, and the maximum speed that caused no problems in production is shown.

The results are shown in Table A below. In Table A, the results of Examples 1, 8, and 17, as shown on pages 34, 36, and 38 of the specification, are also described.

Fluororesin (1): ETFE (ethylene/tetrafluoroethylene copolymer) resin (Aflon LM-720A (trade name), manufactured by Asahi Glass Co., Ltd.); maximum production speed, 20 m/min

Fluororesin (2): ETFE resin (Aflon LM-730A (trade name), manufactured by Asahi Glass Co., Ltd.); maximum production speed, 40 m/min

Fluororesin (3): ETFE resin (TEFZEL 750 (trade name), manufactured by DuPont Mitsui Fluorochemicals); maximum production speed, 25 m/min

Fluororesin (4): FEP (tetrafluoroethylene/hexafluoropropylene) resin (Teflon 100J (trade name), manufactured by DuPont Mitsui Fluorochemicals); maximum production line speed, 50 m/min (this resin is used in Comparative Example 4 of Higashiura '140)

Table A

	Comparative Example 101	Comparative Example 102	Comparative Example 103	Comparative Example 104	Example 1	Example 8	Example 17
Layer structure	3 layers of Fluororesin (1) Aflon LM-730A	3 layers of Fluororesin (2) Aflon LM-720A	3 layers of Fluororesin (3) TEFZEL 750	3 layers of Fluororesin (4) Teflon 100J	3 layers of PES/PES/ PPS-1	3 layers of PES/PES/ PPS-1	3 layers of PEI/PEI/ PPS-1
Diameter of conductor (mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total coating thickness of three layers (μm)	92	106	106	90	105	103	101
Production speed (m/min)	40*1	20*1	25*1	50*1	100*2	100*2	100*2
Dielectric breakdown voltage (kV)	20	24	23	23	24.5	25.5	26.1
Heat resistance Class B [Heat resistance (1)]	Not passed	Not passed	Passed	Passed	Passed	Passed	Passed

(Note)

PES: SUMIKAEXCEL PES 3600 (trade name, manufactured by Sumitomo Chemical Co., Ltd.), a polyethersulfone resin

PPS-1: Dic. PPS FZ2200-A5 (trade name, manufactured by Dainippon Ink & Chemicals, Inc.), tanδ =3.5, a polyphenylenesulfide resin

PEI: ULTEM 1000 (trade name, manufactured by GE Plastics Ltd.), a polyetherimide resin

*1 The maximum production speed attained in the tests

*2 The production speed employed in the tests, which is able to be set faster

As is apparent from the results shown in the above Table A, in the comparative examples, the production speed was, at most, 50 m/min, as in Comparative Example 104, which was significantly slower than the production speed of 100 m/min in each Example according to the present invention. In addition to the above, Comparative Examples 101 and 102 were poor in heat resistance. When the production speed was made faster than the above, the surface of the coating in the comparative examples was more roughened, resulting in a conspicuously poor external appearance. Further, the faster the production speed in the comparative examples was, the poorer the external appearance of the product, as well as other properties required for insulated wire, were, which means no practically acceptable product could be produced under the comparative examples.

In Hosoi '703, there is no mention on extrusion speed of the fluororesin coating layer, but Hosoi '703 describes, in the example section, that the extrusion speed was 6 m/min or 12 m/min, and Hosoi '703 does not teach or suggest production at a production speed as fast as 100 m/min, which was achieved in the examples according to the present invention.

The data already of record in the specification and the supplemental data submitted herewith demonstrate unexpectedly superior results of the claimed multilayer insulated wire and transformer over those of the cited prior art.

4. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: June 28, 2005

Atsushi Higashiura

Atsushi HIGASHIURA